Center Independent Research & Development: GSFC IRAD

Superconducting Vias for High Performance Microwave Applications

Completed Technology Project (2014 - 2015)

Project Introduction

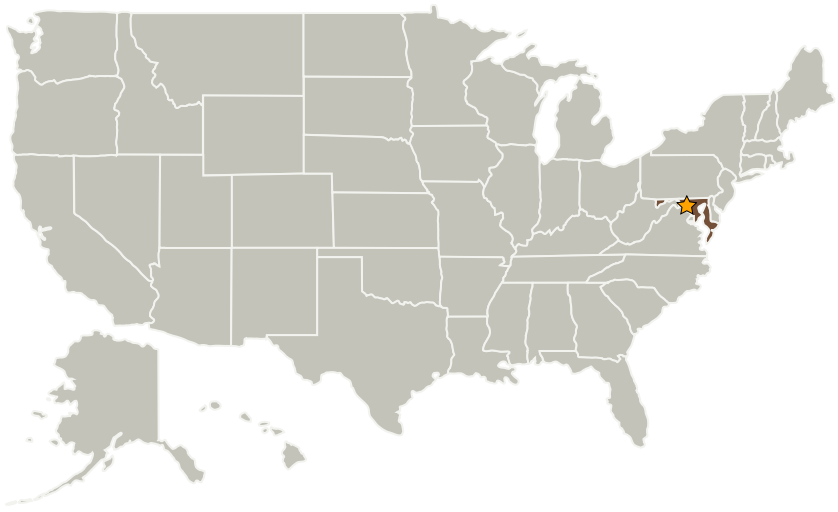
We will develop superconducting vias for use as bridge crossovers with a novel planar sacrificial MEMS (Micro-Electro-Mechanical Systems) process. The resulting circuit structures will be impedance matched and applicable for use below the superconducting gap frequency commonly in use in planar transmission line circuits.

An ultra-broadband air-gap low-parasitic superconducting crossover circuit be optimized, prototyped, and cryogenically evaluated. We will also explore a innovative via-less design concept based on a 4-port symmetric planar junction.

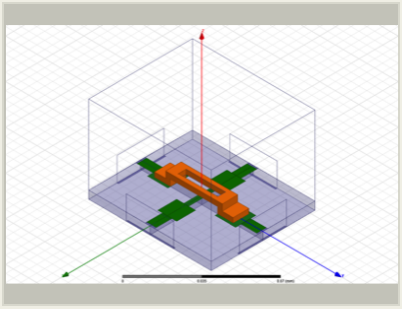
Anticipated Benefits

Instrument concepts under exploration for the Inflation Probe, SPICA, and SPECs would benefit from the proposed effort. More generally, end use of this technology has greater applicability and potential to significantly advance reliable routing and signal control in high frequency planar circuitry.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland



Design concept for superconducting crossover structure for use at millimeter wavelengths.

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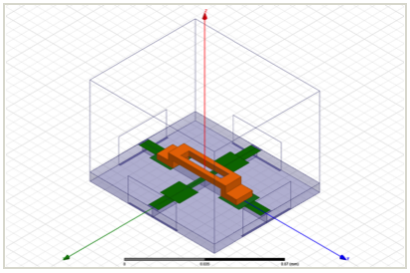
Primary U.S. Work Locations

Maryland

Images



Microwave Crossover
Design concept for superconducting crossover structure for use at millimeter wavelengths.
(https://techport.nasa.gov/image/4216)

Links

Ultra Broadband planar via-less mm-wave crossover with high isolation
(no url provided)

Project Website:

http://aetd.gsfc.nasa.gov

Organizational Responsibility

Responsible Mission Directorate:

Mission Support Directorate (MSD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Center Independent Research & Development: GSFC IRAD

Project Management

Program Manager:

Peter M Hughes

Project Manager:

Stanley D Hunter

Principal Investigator:

Edward J Wollack

Co-Investigators:

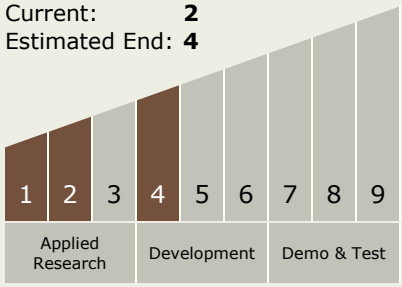
Kongpop U-yen
Kevin L Denis

Superconducting Vias for High Performance Microwave Applications

Completed Technology Project (2014 - 2015)

Technology Maturity (TRL)

Start: **1**
Current: **2**
Estimated End: **4**



Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes